PROCESS HISTORIANS & GE VERNOVA APM

Integration for unparalleled outcomes

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INTRODUCTION

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Process historians are a familiar concept to asset-intensive organizations, having been integral to industrial operations for decades. These sophisticated software systems play a crucial role in capturing and managing time series data generated by various processes, providing valuable insights into operational performance. Despite their long-standing presence and the wealth of data they gather, many organizations struggle to fully use their digital foundation.

The challenge lies not in the availability of data, but in effectively interpreting and utilizing this information to drive informed decision-making and enhance asset management. This paper explores the potential of process historians, examines common obstacles to their effective use, and offers strategies for organizations to harness the full power of their digital infrastructure. By bridging the gap between data collection and actionable insights, asset-intensive industries can enhance operational efficiency, improve maintenance practices, and ultimately achieve a higher level of performance and reliability.

When executed properly, and with the right software partner, historians can be an incredible value center for your operation. **For asset-intensive organizations in the energy space, historians can play a major role in areas including:**

Data Centralization

By combining data from various sources into a single storage location, historians allow for the keeping of long-term data that can help your organization perform analyses and predict trends.

Near Real-Time Monitoring and Analysis

The promise of true 'real-time' is hard to achieve in industrial settings. However, in near real-time, historians can provide operational insights and data that can allow for anomaly detection in the form of predictive and prescriptive maintenance.

Performance Optimization

Historians can identify operational inefficiencies and areas for immediate and long-term improvement, leading to reduced operational costs. This can include a push towards a more predictive maintenance approach, as offered by Asset Performance Management (APM).

Safety and Reliability

If an event should occur, data can be reviewed to prevent future occurrences and allow users to make sure systems are operating in the right parameters.

HISTORIANS AND APM SOFTWARE

Along with process historians, asset-intensive organizations are now adopting specific APM software to extend their ability to analyze and act on data, enhance asset performance, improve operational efficiency, help meet regulatory guidelines, and support more strategic decision making. Many APM software providers are able to provide agnostic integration with historians, along with systems such as ERP/EAM, CMMS, and other business applications to further digitalize an operation.

For asset-intensive industries, the combination of historians and APM can lead to:

Enhanced Data Utilization

Process historians excel in data collection and storage, and APM software can transform this raw data into actionable insights with analytics, digital twins, and other capabilities.

Operational Efficiency

APM can identify inefficiencies and bottlenecks in operations and also help to manage the use of resources such as energy, water, gas, and raw materials to help generate cost savings and sustainability improvements.

Improved Asset Management

Perhaps most important to energy organizations, APM software is able to provide a comprehensive view of asset health and performance, leveraging the properly stored historian data. This helps users assess risk, prioritize maintenance activities, and allocate resources.

Integration and Scalability

As mentioned, APM software should provide organizations the ability to integrate with more than just a historian deployed by the same vendor. By integrating with any historian and enterprise systems, APM software can help enhance data accessibility and utility, as well as provide scale to accommodate growing data.

GE VERNOVA'S APM & HISTORIAN INTEGRATION

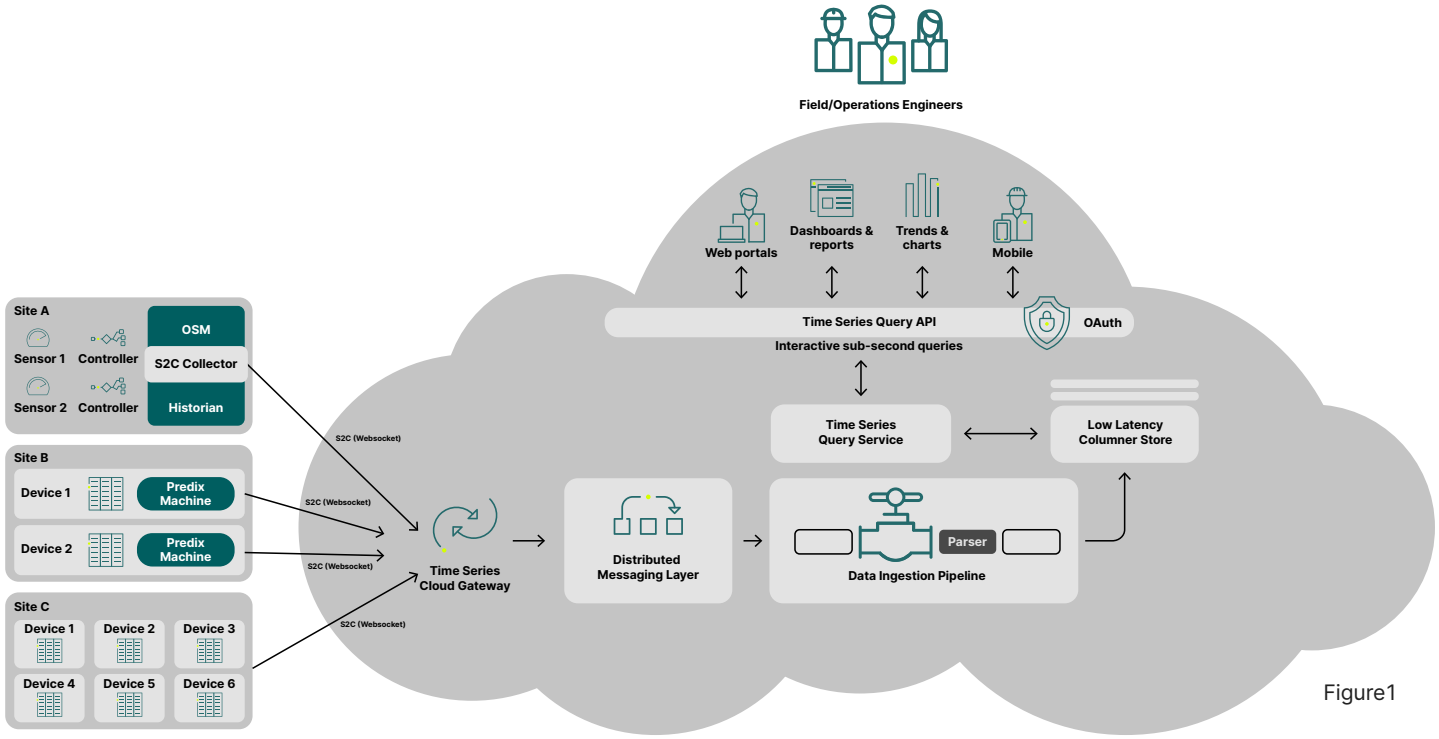

Figure1

01 **Agnostic**

02 **Proven**

03 **Scalable**

04 **Leading APM Functionality**

In summary, energy organizations have adopted APM software in addition to process historians to enhance their ability to analyze and act on data, boost asset performance, improve operational efficiency, align with regulatory compliance, and support strategic decision-making. This transition is driven by the need to stay competitive, reduce costs, and improve the reliability and safety of operations in an increasingly complex and data-rich environment.

As you can see in Figure 1, GE Vernova's cloud-based APM offers organizations the ability to integrate with any historian. But, before we get into the historian aspect, it is important to highlight another data sequence that is highly critical to your operation: time series.

Time series is a sequence of data collected or recorded at specific and often equally spaced intervals over time. Each data point is associated with a timestamp, providing context for the value it represents at a particular moment.

Some key characteristics of time series data include:

Temporal Ordering

Order in which data points occur are important for analysis.

Chronological Sequence

Allows analysis of trends and patterns over time.

Frequency

High-frequency (seconds or milliseconds) or low-frequency (hours, days, months, years).

USE CASE

In our use case, time series data is used in the above ways to get sensor readings from machinery, look into production output, and monitor equipment performance. This enables users to perform trend analyses, detect potential seasonality impacts, identify anomalies, and even forecast using machine learning (ML). Now that we have a level set, let's take a look at how both historians and APM use data.

HISTORIANS & TIME SERIES

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Process historians are developed to effectively collect, store, and manage time series data. Across manufacturing, energy, and other asset-heavy industries, historians are used to monitor and analyze operations. Historians, such as GE Vernova's Proficy Historian, manage time series data in the following ways:

DATA COLLECTION

Process historians collect data from various sources such as sensors, control systems, and other industrial equipment. These sources often use protocols like Open Platform Communications (OPC), Modbus, and Message Queuing Telemetry Transport (MQTT) to communicate data. Each data source provides a stream of data points, which are typically timestamped and include a value and quality indicator. The timestamp indicates when the data was recorded, and the quality indicator shows the reliability or accuracy of the data.

DATA STORAGE

The collected data is stored in a time series database, optimized for handling high volumes of time stamped data. Unlike traditional relational databases, time series databases are made to efficiently store, retrieve, and manage data that changes over time. To manage large volumes of data, process historians often use data compression techniques. This can include lossless compression, where the original data can be fully reconstructed, or lossy compression, where some level of precision is sacrificed for storage efficiency.

DATA MANAGEMENT

Process historians can archive historical data for long-term storage, ensuring that data remains accessible for analysis while minimizing the storage footprint. Users can define retention policies to determine how long data should be kept. Critical data may be retained indefinitely, while less important data might be discarded after a certain period.

APM & TIME SERIES

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Here's how APM software works with time series data:

INGESTION

APM software collects time series data from various sources, including sensors, control systems, and process historians. This data typically includes metrics such as temperature, pressure, vibration, and flow rates, which are relevant to asset performance.

MANAGEMENT

APM software may include tools for cleansing and preprocessing data, such as handling missing values, filtering out noise, and normalizing data. This helps to deliver data that is accurate and reliable for analysis.

SUPPORT AND ACTION

APM software can integrate with work order management systems to automate the creation and tracking of maintenance tasks. This helps to ensure that issues are addressed promptly and efficiently. By analyzing time series data and asset performance over time, organizations can continuously improve their maintenance practices and asset management strategies.

INSIGHTS

Condition Monitoring:

APM systems continuously monitor the condition of assets using real-time and historical time series data. They can detect anomalies or deviations from normal operating conditions, alerting operators to potential issues.

Predictive Analytics:

APM software uses advanced analytics and ML models to predict future asset performance and potential failures. These models analyze historical time series data to identify patterns and trends that indicate potential problems.

Performance Optimization:

By analyzing time series data, APM systems can identify inefficiencies in asset operation and suggest optimization strategies. This may include adjusting operational parameters, scheduling maintenance, or replacing parts.

Risk Assessment:

APM software assesses the risk of asset failure based on historical data and current conditions. It can prioritize maintenance tasks based on the criticality of assets and the potential impact of failure.

GE VERNOVA'S APM & HISTORIAN

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Now that we are centered in how each software from GE Vernova is using data and for what outcomes, it becomes clearer on how the two can work together for amplified outcomes. For APM, data is replicated from the source to a GE Vernova time series instance via adapters (Edge, historians, or custom-written code to interact with a time series endpoint).

Data is replicated from the source to our time series instance via adaptors for Edge, historian, or custom-written code to interact with our time series ingestion endpoint. This process works for any historian including GE Vernova's own Proficy Historian and others, such as OSI-PI.

MAXIMIZE DATA INSIGHTS WITH INTEROPERABLE APM

Managing tremendous amounts of time series data can be challenging for asset-intensive industrial organizations. However, GE Vernova's APM features intuitive integration with your chosen historian software, helping you get the most value from both software types.

Get started with a discussion about your APM software needs.

Contact us